



Ethernet Adaptor 01-103

User Manual

**SPARR
ELECTRONICS
LIMITED**

Sparr Electronics Ltd.

No. 43, YMS Complex, HMT Main Road, Mathikere,
Bangalore - 560054, INDIA.

Phone: +91-80-23602836, +91-80-23606308

Fax: +91-80-23608346

E-mail: info@sparrl.com

Web: <http://www.sparrl.com>

CONTENTS

1. Introduction.....	01
1.1. About Ethernet Adaptor (EAD) – Overview	01
1.2. Network Protocol.....	01
1.2.1. Ethernet Address or MAC Address	01
1.2.2. Internet Protocol (IP) Address	02
1.2.3. Port Number.....	02
2. EAD Kit Contains	02
3. Product Description	02
3. 1. Serial Interface	02
3. 2. Network Interface	02
3. 3. LED functions	03
3. 4. Power Input	03
4. Connection and Pinout Diagrams	04
5. Programming through Hyper Terminal, Telnet and Web Browser	06
5. 1. Programming through Hyper Terminal	06
5. 1. 1. Serial Port Login & Programming of EAD Parameters	06
5. 2. Programming through Telnet	07
5. 3. Auto IP Programming	08
5. 4. Programming through Web browser	09
5. 4. 1. Starting Up	09
6. EAD Setup Parameters	13
7. Parameter Description	14
7. 1. Network Configuration	14
7. 2. Serial Configuration.....	15
7. 3. Server Configuration.....	16

7. 4. Load factory defaults.....	20
7. 5. Change Configuration Password	20
7. 6. Save and Exit	20
7. 7. Exit Configuration Mode	20
7. 8. To upload new firmware.....	20
7. 9. Enable Boot Messages.....	20
8. Factory Default Values.....	21
9. EAD01-103 Operations under Modbus Protocol.....	22
10. EAD01-103 Operations under PPP Protocol.....	22
11. EAD01-103 Operations under SNMP Protocol.....	22
12. EAD01-103 Data Backup.....	22
13. EAD Operation in RS 232/ RS 422 / RS 485 Modes	23
14. Product Physical Details	24
15. Troubleshooting	26
16. Glossary of Terms	27
17. Declaration of Conformity.....	32

1 Introduction

1.1 About Ethernet Adaptor (EAD01-103) - Overview

EAD01-103 is a Device that converts RS-232 serial data into TCP/IP protocol. It enables remote gauging, managing and control of a Serial Device through the network based on Ethernet and TCP/IP by connecting to the existing equipment with RS-232 serial interface. In other words, EAD is a protocol converter that transmits the data sent by Serial equipment as TCP/IP data type and converts back the TCP/IP data received through the network into serial data to transmit back to the equipment. EAD01-103 also supports UDP Protocol for Broadcast kind of application.

The EAD01-103 allows you to network-enable a variety of serial devices that were not originally designed to be networked. This capability brings the advantages of remote management and data accessibility to thousands of serial devices over the network.

The EAD01-103 is the low cost Serial RS 232 to Ethernet LAN 10/100 Mbps connectivity system using the TCP/IP protocol and based on a cold fire high speed 32-bit microprocessor. It is having built in web server. The EAD01-103 supports RS 232 serial communication allowing virtually any asynchronous serial connectivity device to be accessed over a network. Some models do Support RS 485 and RS 422 connectivity as add-on feature.

As for the Internet connectivity, the EAD01-103 supports open network protocols such as TCP/IP allowing Serial Devices to be accessed over broadband network or conventional LAN (Local Area Network) environment.

The EAD01-103 provides the management console using Web Browser, Telnet and Serial console port under the password protection support. The EAD was designed to accommodate the unique requirements of the Retail POS, Security, Automation and Medical marketplaces.

Parts of this manual assume the knowledge on concepts of the Internetworking protocols and serial communications. If you are not familiar with these concepts, please refer to the standards or the documentation on each subject.

1.2. Network Protocol

The EAD01-103 uses IP protocol for network communications. For network connections to the Serial port TCP, UDP, ICMP, MAC, DHCP and Telnet protocols are used.

1.2.1. Ethernet Address or MAC Address

The Ethernet adaptors have what is known as Hardware address or MAC address. It has its own addressing scheme based on a unique six-byte address. This is generally called Media Access and Control (MAC) address.

One example of Ethernet Address is given below:

00-17-85-01-36-0C <i>or</i> 00:17:85:01:36:0C

1.2.2. Internet Protocol (IP) Address

To identify an individual computer/device on the IP network, the device must have a unique IP address in a Network. The current version of Internet Protocol uses a four-byte number, expressed in dotted decimal notation.

Sample IP Address

192.168.0.250

1.2.3. Port Number

Every TCP connection is established using a destination IP address and a Port number. For example Telnet application commonly uses port number 23 of contacted IP number.

The EAD's Serial channel (port) can be associated with a specific TCP or UDP Port number. E.g. Port number 7727 (as source port number)

2 EAD Kit Contains

1. Ethernet Adaptor
2. User Guide
3. Instructions / Pin out diagram - Based on Model

3 Product Description

This section describes various components of EAD01-103 and explains how to install it on a basic network

3.1. Serial Interface

The EAD01-103 has a 9- pin RS 232 Male Serial connector in the Metal Box (MB) unit or with Open Wire / with connectors for PCB Board Level Product (depending on the model), which can be connected to any Serial device.

3.2. Network Interface

EAD01-103 has one RJ45 Female 10 Base-T or 100 Base-TX Connector Ethernet port that supports up to 100 Mbps speed for connection to Local Area Network (LAN) through Hub or Switch. You can also use a Cross Cable to connect to PC's LAN Card directly.

3.3. LED functions

Four LED's are located on the top of the unit. One Marked as POWER, which has RED LED, second one marked as CONNECT which has YELLOW LED, third one marked as TX which has GREEN LED, fourth one marked as RX which has YELLOW LED The following table explains their functions.

LED state	Function
Red LED glowing	Power On
Yellow LED blinking	EAD is connected to Ethernet Link
Yellow LED Fast Blinking	IP number conflict with other Device.
Both Red and Yellow LEDs are glowing	EAD is ready to use.
Yellow LED Blinking when Ethernet LAN not connected	Will blink for 12.5 seconds and waits for "Enter" Character from Serial Port to get in to Configuration mode
Green (TX) LED glowing	Data is transmitting through serial
Yellow (RX) LED glowing	Data is receiving through serial
CONNECT LED will be off when 'LOAD FACTORY DEFAULT' switch is pressed continuously for 10 seconds.	

3.4. Power Input

There is an Input power socket in the EAD01 MBX model, which can take in 9V AC 300 mA Power where you can plug in the Power adaptor supplied along with the unit. The MB model has In-built Power supply with a 2 Pin Power CHORD for plugging to Mains power socket. The Board level product takes in +5 V to +24V DC.

4 Connection and Pinout Diagrams

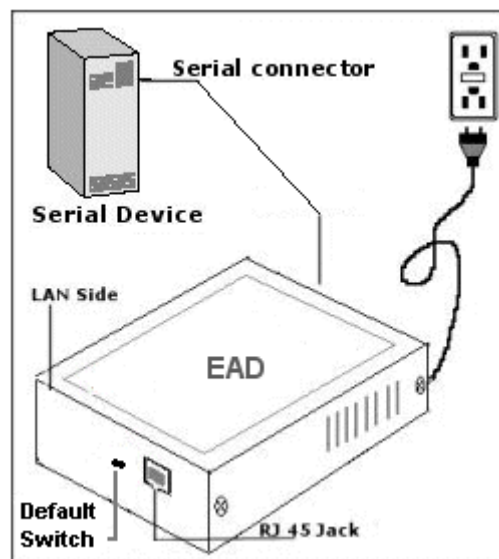
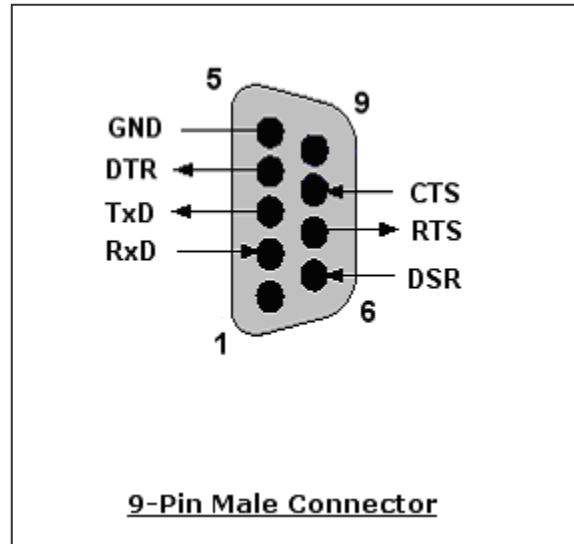


Figure. 1. Connection diagram



*Figure. 2. EAD 01-103 MB Model
9-pin Male Pin out Diagram*

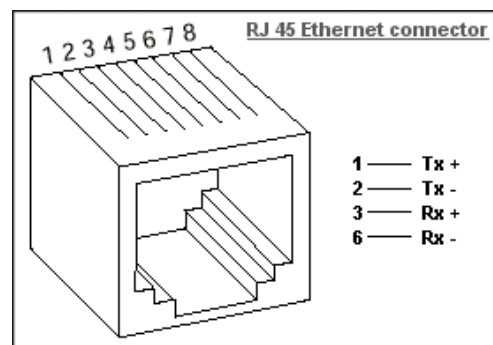


Figure. 3. RJ- 45 Jack

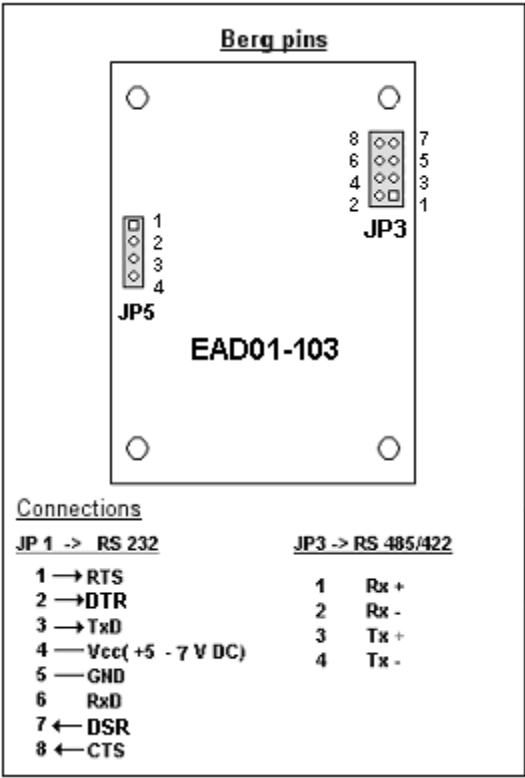
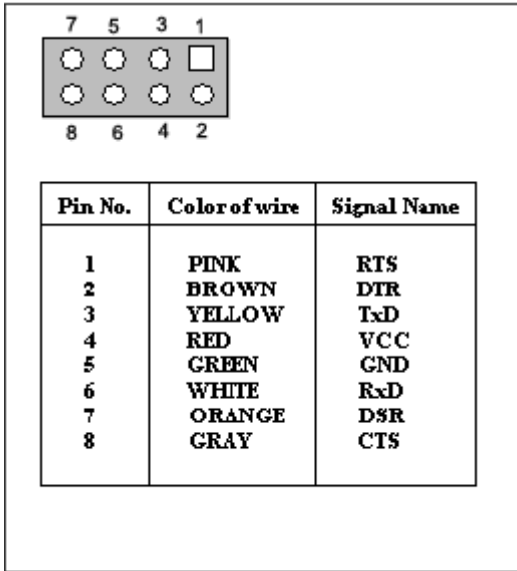


Figure. 4. EAD 01-103 B Berg Pin out Diagram.



Berg pin Female with wire

Figure: 5. EAD 01-103B Berg Pin out Diagram.

5 Programming through Hyper Terminal, Telnet and Web Browser

You can configure the EAD01-103 in three possible ways. They are described in detail as below.

5.1. Programming through Hyper Terminal

5.1.1. Serial Port Login & Programming of EAD01-103 Parameters.

- 1 Use any Communication Program like Hyper Terminal, XTalk, and Mirror etc to configure EAD01-103 through RS 232 Serial Interface. The Serial port settings should be set to 9600 bps, 8 data bits, No Parity, 1 Stop bit with Flow control option selected as none. Select appropriate Communication (COM) port to which the EAD is connected in the software.
- 2 To enter the *Configuration Mode*, Remove the RJ45 LAN Jack and power ON the EAD. You will get a Message in the Hyper Terminal “**Network Error, Press Enter for Configuration...Waiting 12.5 Sec....**” Press Enter Key to proceed with the Configuration.
- 3 Once the EAD senses the Enter key, the unit will first send the following string which will appear on Screen:

Enter configuration password:

Enter the default Password, that is 77277.

(If the password entered is wrong, then the EAD will prompt you to re-enter Correct Password for three times. If all the three attempts fail then you will have to follow step 2 in getting the option to enter a password again. If you are still not successful, please do call us for resetting of Password with Master Password from Factory).

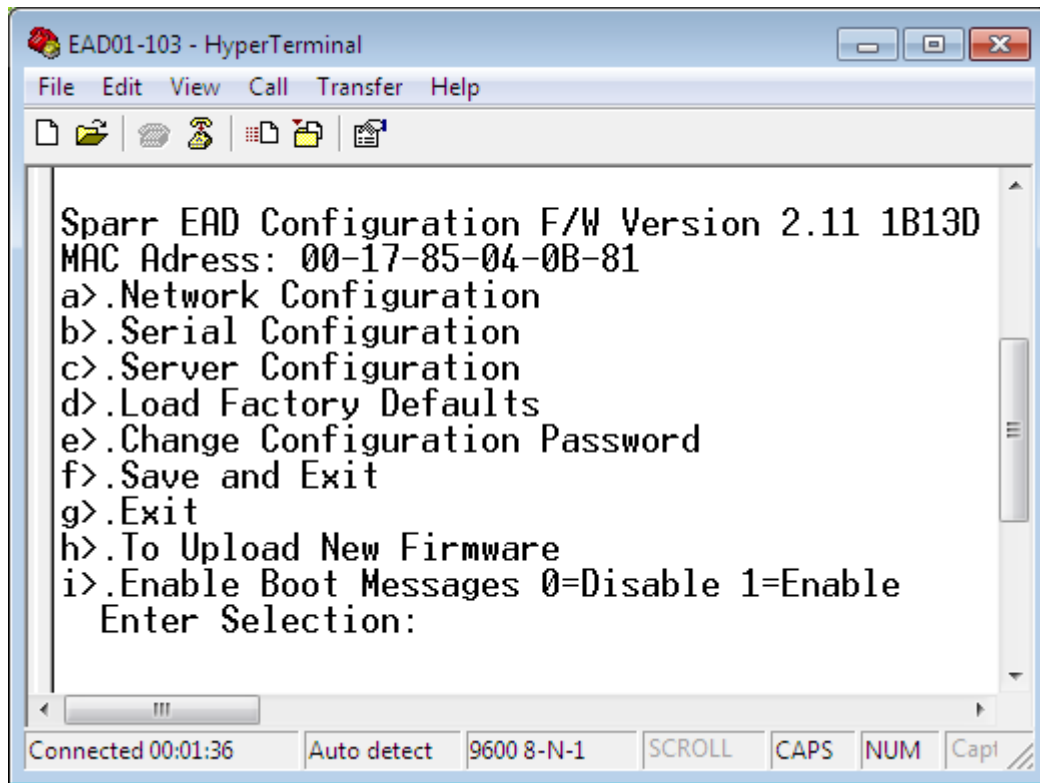


Figure 6. Programming through Hyper Terminal

4 Enter the choice, for example ‘a’ for entering the *Network configuration* mode, and configure the EAD. **Note that the Options / Choices are Case Sensitive.** Refer the Section: 8 for various options and the functionality.

5.2. Programming through Telnet

EAD can also be programmed through Telnet program available in Windows. Open the Telnet program by Typing Telnet in Start→ Run→ Open and select ‘Connect as Remote System’ from the Connect menu.

Please see the screen shot below: -

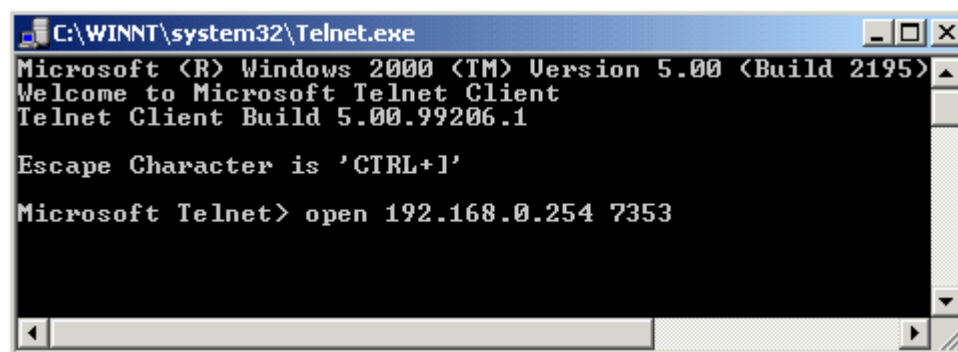


Figure. 7. Connect through Telnet

Enter the correct Host Name (IP Address) and the Port number. Host Name is the IP address you programmed and assigned to your EAD01-103, for example 192.168.0.254. The reserved Port number in EAD for configuration through Telnet is **7353**. Click on 'Connect' and enter the Password when prompted. Default password is 77277. Change the parameters as per your choice. For detailed description on parameters of EAD, see later section.

Note: - If you want to program through the Telnet then the Port number should always be **7353**.

The telnet command and options screen will look same under Windows 2000 and XP where you will have to use > open 192.168.0.254 7353 after issuing Telnet command in the Run.

5.3. Auto IP Programming

If the user knows only the MAC address of the EAD and doesn't know the IP address then you can program it by adding "arp" (Address resolution Protocol) entry in his Computer and then connect through telnet using that IP and port number 7353.

For adding the "arp" entry, go to the DOS or Command prompt in your PC and enter the IP and MAC address as below.

C:\> arp -s [IP address] [MAC Address]

For example: -

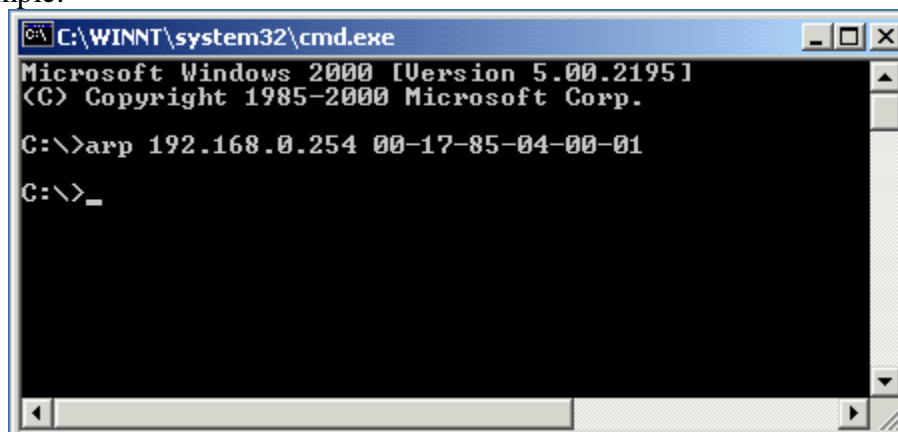


Figure. 8. Auto IP Programming using arp

Once the Arp entry is added, try to ping the EAD using the command:

Ping [IP address] -l 102

and ensure the ping response is successful.

You can now program the EAD through Telnet program. Enter the Host Name as the IP that you set in your system ARP table, and the Port should be **7353**.

Follow the steps mentioned above for programming through Telnet and setup the EAD as you require.

Please make a note that you may not be able to PING the Device as of now until you set / store an IP Number permanently

5.4. Programming through WEB BROWSER

EAD can also be programmed through the web browser using http protocol. All the EAD setup parameters are not programmable through the web browser. If you do not know the IP Number of the EAD you can press the 'LOAD DEFAULT' switch for 10 seconds continuously to load EAD Default parameter values and then use IP number 192.168.0.254 in the browser. We recommend you to use internet Explorer 6.0 and above as browser.

5.4.1. Starting up.

In order to program EAD from web browser, open a new web browser window in your computer. Enter 'http://' and the correct IP Address in the browser address field and press the 'Enter' key. Enter the Password when prompted. Default password is 77277. Change the parameters as per your choice. For detailed description on parameters of EAD, see later section.

For example: -

If the IP Number of the EAD is 192.168.0.254 then you have to enter http://192.168.0.254 in the web browser address field and press 'Enter' Key.

After changing the parameter value in any of the browsed page, you need to click on 'Update' button in the same page and finally need to click on 'Save & Reboot' button from any page. If u wants to load default values click on 'Load default' from any page and then click on save & Reboot.

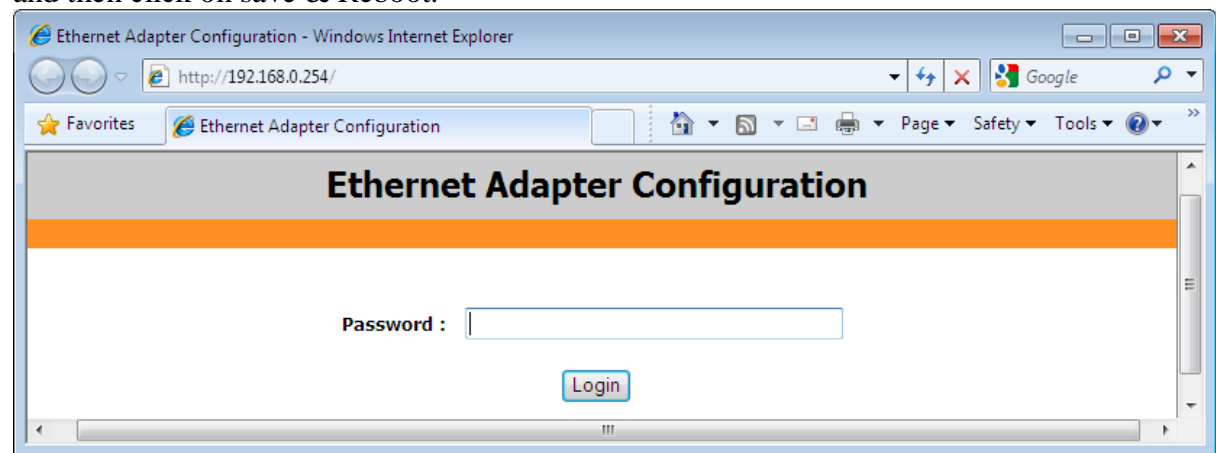


Figure. 9. EAD01-103 LOG-IN page in browser

Default login password is 77277. Whenever click on login it will show Home Page (figure.10). This page displays EAD MAC Address, Firmware version, Product Model and Boot loader details.

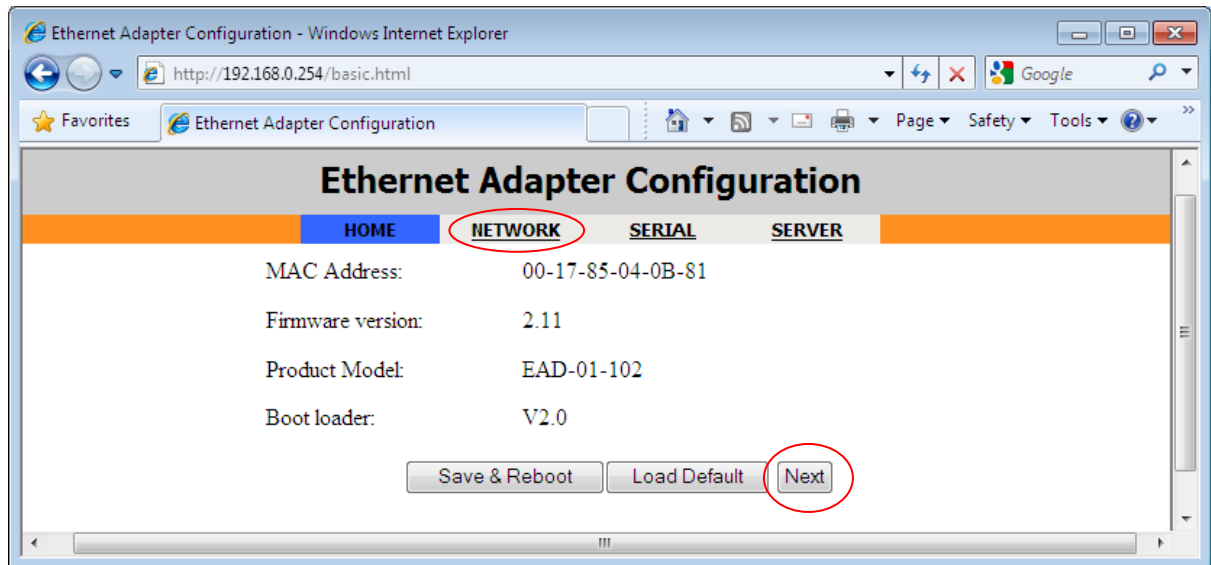


Figure. 10. EAD01-103 Home page in browser

User can click on NETWORK or Next which is marked in figure 10, it will show network configuration page (figure.11). Using this page we can configure IP address, subnet mask, gateway, Port number, Network Interface, DHCP and transport protocol. All these parameters are explained in Section 7.1.

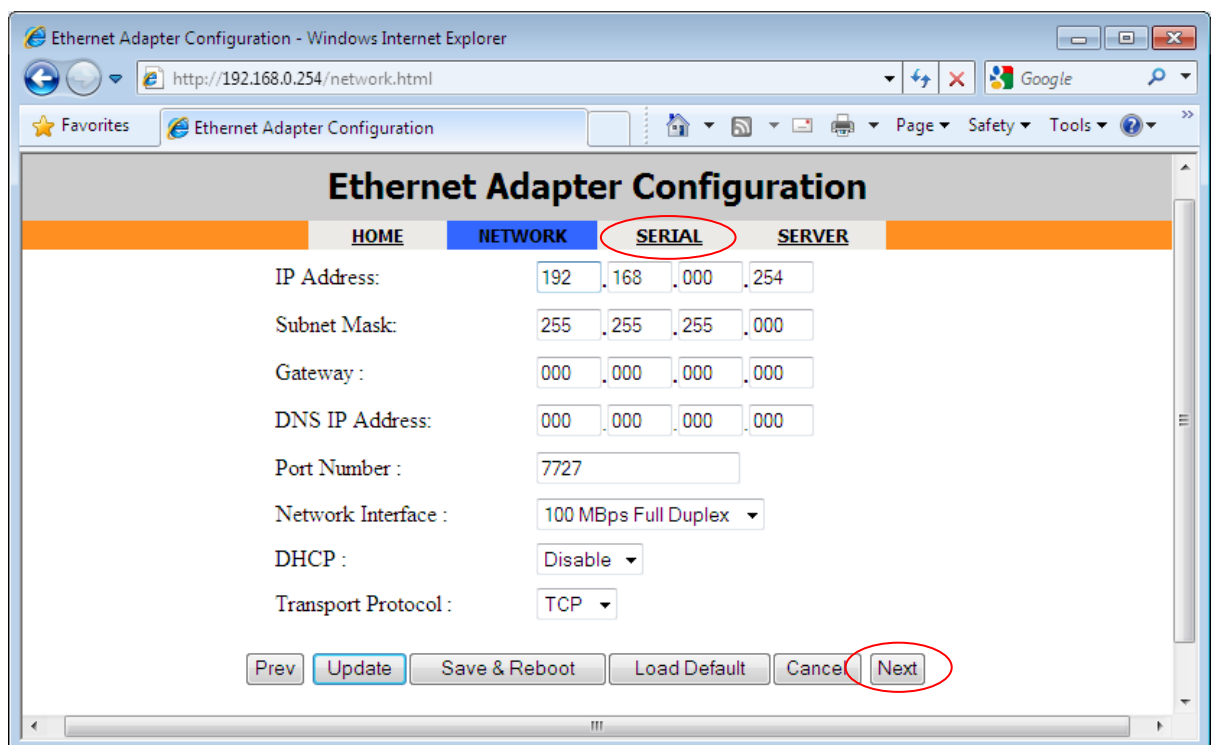


Figure. 11. EAD01-103 NETWORK configuration page in browser

Whenever click on SERIAL or Next which is marked in figure 11, it will display serial configuration page (figure.12).using this we can configure Baud rate, Data bits, Parity, stop bits, flow control, Serial I/F Mode, Character wait time out, Inter character delay, connection status reporting and XON-XOFF pass through. All these parameters are explained in Section 7.2.

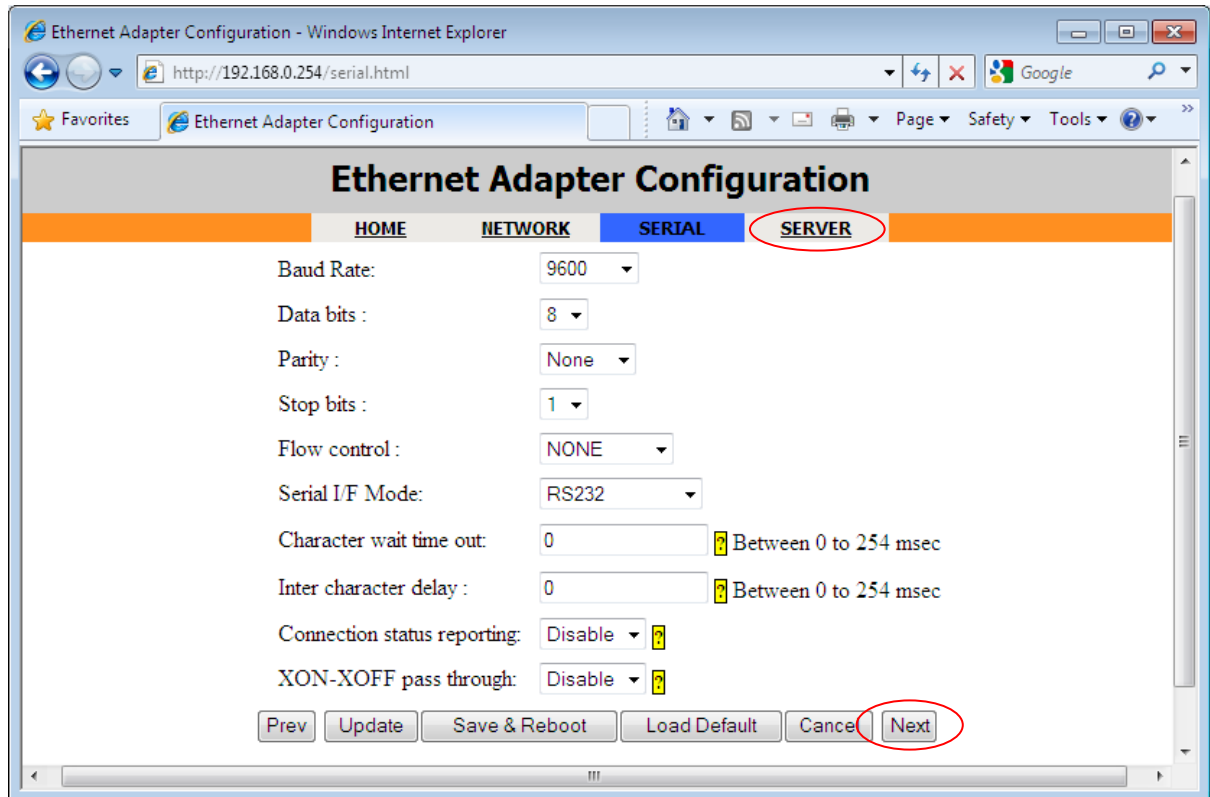


Figure. 12. EAD01-103 SERIAL configuration page in browser

Click on SERVER or Next which is marked in figure 12, to view the server configuration page (figure.13).This page is used to configure the server parameters IP Filtering, start Mode, Accept incoming connection, Remote IP address, Remote Port Number, Send CR with LF, Accept serial data when not connoted, No of characters in packet, connection inactive timeout, Disconnect active connection on data, Disconnect active connection on DSR, DTR active on connect only, Defeat long ACK, Restart on loss of link , Telnet IAC and packet data. All these parameters are explained in Section 7.3.

Ethernet Adapter Configuration - Windows Internet Explorer

http://192.168.0.254/server.html

Ethernet Adapter Configuration

Ethernet Adapter Configuration

HOME NETWORK SERIAL **SERVER**

IP Filtering: 000.000.000.000
000.000.000.000
000.000.000.000
000.000.000.000
000.000.000.000 ?

Start mode: Auto Start ?

Accept incoming connection: Enable ?

Remote IP address: 000.000.000.000 ?

Remote Port number: 0 ?

Send CR with LF: Disable ?

Accept serial data when not connected: Enable ?

No of characters in a packet: 254 ? 1 - 254

Connection inactive timeout: 300 ? 1 - 65534 sec, 65535 to Disable

Disconnect active connection on data: 00.00.00.00.00.00 ?

Disconnect active connection on DSR: Disable ?

DTR active on connect only: Disable

Defeat Long ACK: Enable ?

Restart on loss of link: Enable

Telnet IAC: Disable

Pack Data: Disable ?

Prev Update Save & Reboot Load Default Cancel

Figure. 13. EAD01-103 SERVER configuration page in browser

6 EAD Setup Parameters

The Main Configuration Menu items are listed and explained below.

- a) Network configuration
- b) Serial configuration
- c) Server configuration
- d) Load factory defaults
- e) Change configuration password
- f) Save and Exit
- g) Exit
- h) To upload new firmware.
- i) Enable Boot Messages 0=Disable 1=Enable

*In the **Network configuration** section there are eight parameters as mentioned below.*

- a) IP Address
- b) Netmask
- c) Gateway
- d) DNS IP Address
- e) Port number
- f) Exit
- g) Transport protocol 0 = TCP 1 = UDP
- h) Network Interface
- i) DHCP 0=Disable 1=Enable

*Under the **Serial configuration** menu, there are seven parameters:*

- a) Baud rate
- b) Data Parameters
- c) Flow control
- d) Serial I/F Mode
- e) Character wait timeout [00 – 254 msec]
- f) Inter Character delay [00- 254 msec]
- g) Connection status reporting. 0=Disable 1=Enable
- h) XON-XOFF pass through, 0=Disable 1=Enable
- i) Exit

*Under the **Server configuration** menu, there are fifteen parameters:*

- a) IP Filtering
- b) Start mode
- c) Accept incoming connection, 0 = Disable , 1= Enable
- d) Remote IP address
- e) Remote Port number
- f) Send CR with LF, 0 = Disable, 1= Enable
- g) Accept serial data when not connected, 0 = Disable, 1= Enable
- h) No. Of characters in a Packet 1 - 254
- i) Connection Inactivity Timeout [1 - 65534 Sec, 65535 to Disable]
- j) Disconnect Active connection on Data
- k) Disconnect Active connection on DSR 0=Disable 1=Enable
- l) Packet Data 0 = Disable 1 = Enable
- m) DTR active on Connect Only 0=Disable 1=Enable
- n) Exit

- o) Defeat Long Ack 0=Disable 1=Enable
- p) Restart on loss of link 0=Disable 1=Enable
- q) Telnet IAC 0=Disable 1=Enable
- r) Telnet IAC Terminal Type

7 Parameter Description

7.1. Network Configuration.

Under the Network configuration there are eight parameters, which are programmable. The parameters are explained below.

7.1.1. IP Address.

The IP address must be set to a unique value in your network. (See section 1.2.2). The EAD cannot connect to the network if the assigned IP address is already in use by any another device. **Default is 192.168.0.254**

Example:-**192.168.0.250.**

Please do set the IP number to 0.0.0.0, if you wish the EAD to acquire IP number from DHCP Server in your Network automatically.

7.1.2. Netmask.

A netmask defines the number of bits taken from the IP address that are assigned for the host section. **Default is 255.255.255.0**

Example: - **255.255.255.0**

7.1.3. Gateway.

The Gateway or Router allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment. The gateway address must be within the local network address range. **There is no default value.**

Example: - **192.168.0.XXX**

7.1.4. Port Number.

This setting represents the port number for TCP connections to the serial device. Once the IP number is selected and the port number is opened then the serial device becomes transparent for data Transfer. **Default value is 7727.** You can select values from 1 to 65535 based on your application TCP socket program. The suggested value for this is from 3000 upwards.

7.1.5. EXIT

Use this option to exit and come back to the previous selection menu.

7.1.6. Transport Protocol 0= TCP 1=UDP

This setup makes EAD to Transmit and Receive serial data to and from LAN in appropriate Protocol format selected. TCP is chosen for directed data communication and UDP is selected for Broadcast applications. **Default setting is TCP.**

7.1.7. Network Interface

This setting represents the Link speed and Duplex mode of EAD. Set the correct Link speed with option Auto Negotiation, 100MBps, 10MBps and duplex modes Half Duplex, Full duplex. **Default setting is 100MBps.**

7.1.8. DHCP

If this option is enabled and a DHCP server exists on the network, it provides the unit with an IP address, gateway address, and subnet mask when the unit boots up. **Default setting is Disable.**

7.2. Serial Configuration

This section helps in configuring the Serial port parameters of the EAD. The parameters are described below.

7.2.1. Baud rate.

The EAD is normally attached to a Serial device, which needs to be controlled from LAN. The speed or baud rate selected should match between Serial Device and the setting in the EAD for proper Serial data transfer. Set the correct baud rate with option “a” to “j” for valid baud rates of 300,600,1200, 2400, 4800, **9600 (Default)**, 19200,38400,57600 and 115200 bps.

7.2.2. Data Parameter.

There are **Ten** options available for Data parameters settings with choice from “a” to “j” for various Data bits, Parity and Stop bit selections.

N (No Parity), 8(Data bit), 1(Stop bit) (default)

E (Even Parity), 7(Data bit), 1(Stop bit)

O (Odd Parity), 7 (Data Bits), 1(Stop Bit)

E (Even Parity), 8(Data bit), 1(Stop bit)

O (Odd Parity), 8(Data bit), 1(Stop bit)

N (No Parity), 8(Data bit), 2 (Stop bit)

E (Even Parity), 7(Data bit), 2(Stop bits)

O (Odd Parity), 7(Data bit), 2(Stop bits)

M (Mark Parity), 8(Data bit), 1(Stop bit) and

S (Space Parity), 8(Data bit), 1(Stop bit)

7.2.3. Flow Control

Flow control is required for handshake with the Serial device for stopping serial data input/output to avoid character loss. Supported options are NONE for No Flow control, XON/XOFF for Software Flow control and RTS/CTS for Hardware Flow control.
Default None

It is highly recommended to use Flow control for higher Serial speed applications.

7.2.4 Serial I/F Mode

EAD supports **RS232 (Default)**, RS485 (2 Wire) and RS422 (4 Wire) Serial port Interface characteristics based on the option and need of the customer. The same is enabled in the option when the Hardware is supported in the unit.

7.2.5. Character Wait Timeout

Character wait time out defines how long the EAD should wait before sending accumulated serial characters to network. Serial data arrives at EAD, which is packetized and sent through the LAN after this period. Set this to smaller value for immediate transfer. **Default is 0 Milliseconds. You can set this up to 254 milliseconds**

7.2.6. Inter Character Delay

Inter Character delay is the delay between two characters from the EAD to the serial port / device. The range is from 00 to maximum of 254msec.**Default 0 milliseconds.** Higher Inter- Character delay is selected if the device can receive the serial character only with delay between characters.

7.2.7. Connection Status Reporting

Once EAD establishes connection with the Remote Server Machine in Auto Mode or based on number of Characters, the user can be intimated with a connect Message. This reporting of connection status can be Enabled or Disabled. **(Default - Disabled)**. When Enabled with Option 1, CONNECTED message is displayed when socket connection is successful in port 7727 and DISCONNECTED message when the connection drops. The Status reporting does not happen when there is Passive or Connection from Server takes place.

7.2.8. XON XOFF Pass through

XON XOFF pass through when is enable we can send the data to server, **Default Setting is Disable.**

7.2.9. Exit

Use this option to exit and come back to the previous selection menu

7.3. Server Configuration

Under *Server Configuration* various parameters required for EAD to connect to Server are provided and the available options are described below.

7.3.1. IP Filtering

This innovative and useful option is available under Server Configuration. The main purpose of the same is ensure that only the relevant or select computers in the Network connects or communicates to the EAD and prevents all other computers in the Network interfering or intruding in its operation.

There are entries for 5 IP numbers under this menu. When all of them are set to **0.0.0.0**, the IP Filtering option is **Disabled (Default)**.

Entry of the IP number or numbers in this option enables this Feature and ensures that only the computers or devices with these IP number can Ping, Telnet to ports 7353 or 7727 and use browse interface. For all others, these operations will not be permitted.

Note:

1. Please note that once this is set, the EAD Will be accessible (even for ping) only from the PC having that IP address
2. There is one exception to this in case of forgotten IP numbers in the list. The IP number 192.168.0.1 is the only IP permitted always even if it is not set in the IP Filter table.

Do make a note of the following points:

1. If the unit is set with **Gateway IP address**, you should add the same in **IP Filter list**.
2. If you are setting the EAD to **Auto connect to Server on Power-up or based on input characters**, then the **Server IP should be added** to this list.

7.3.2. Start Mode

There are three types of start modes available. 0 for *Auto start*, 1 for *Manual mode* and 2 for *Input character*.

Auto Start: - This mode is selected when you want EAD to automatically connect on Power Up to a Server in Network running any application listening for incoming connections. The connection parameters like the Remote IP address and the TCP port number parameters have to be configured and saved for this. If Automatic connection method is selected (here you can program the time to get connected after switching on the unit also), all parameters must be provided. (i.e. Remote IP, Remote port number, Start mode = 0). It will connect to the programmed IP address and the port number according to the time programmed. Waiting time range from 1-999 seconds. **The Default time is 60 Seconds.**

It is not possible to set waiting time through web browser.

Manual Mode: - In the manual mode, TCP connection can be made by entering command from Terminal or Serial port as:

C IP Address/Port Number (No space between C and IP address).

Example: - **C192.168.0.250/25.**

Note: The “C” should be in Capital only as it is Case Sensitive.

Input Character Mode: - This Mode is selected when you require EAD to connect automatically to Server when there is character from the Serial Port. For the input character mode automatic connection, Remote IP address and the TCP port number parameters are required and should be programmed. If the Input character mode is selected (here you can program the number of characters given as input), all parameters must be provided. (i.e. Remote IP, Remote port number, Start mode = 2). It will connect to the programmed IP address and the port number when unit receives the number of characters equal to the one you programmed. It will allow number of input characters from 1 to 999.

The Default number of character is 1.

Default setting is Auto. But will behave as manual, if the Remote IP and port numbers are set to 0 (Section 8.3.4 and 8.3.5)

It is not possible to set number of characters through web browser.

7.3.3. Accept Incoming Connection

Set the incoming connection as enable or disable. This should be enabled for a Computer in the Network to initiate connection to the EAD01-103. This can be disabled if EAD01-103 makes the connection to the Server and does not require connection from Server.

Default setting is Enable

7.3.4. Remote IP Address

When the start mode is Auto start (automatic connection) or based on Input Character Mode, EAD makes a connection to this IP address on the network. This IP address should be within your Network IP Range. **Default Setting is 0**

7.3.5. Remote Port Number

The remote TCP port number must be set for automatic connections and for connection based on Input Character Mode. This parameter defines the port number on the target host to which a TCP connection is attempted. This works in conjunction with Remote IP Address. **Default Setting is 0**

7.3.6. Send CR with LF.

EAD in addition can send a line feed character (LF) with every Carriage return (CR) received from the Serial Port to the Host PC, if this option is enabled. The available option is Disable or Enable. **Default Setting is Disable**

7.3.7. Accept serial data when not connected.

This setup is basically to Enable or Disable the EAD to buffer the serial data when there is no TCP Connection to the Server. The maximum buffer size is dependent on the value set in Rx Buffer set under Serial configuration. **Default Setting is Enable.**

7.3.8 Number of Characters in a Packet

This option allows user to set the number of characters EAD should collect from Serial Port and then Packetizes to send to Server. This is useful in situation where there is a set string of characters arrive from Serial port regularly for sending to Server. **The Default value is 254.** This works in conjunction with the option of Pack Data when it is enabled. It will allow number of characters in a packet range must be 1 to 254.

7.3.9. Connection Inactivity Timeout.

Use this parameter to set inactivity time out. The connection is dropped if there is no activity on the serial or LAN side after the set time expires. The range of selection is from 01 to 65535 Seconds. **Default 300 (Three hundred Seconds).**

7.3.10. Disconnect Active Connection on Data.

When EAD is connected to the remote server, then user can disconnect the EAD TCP connection by sending the Disconnect character programmed from the Serial Port. Disconnect character should be in HEX, from **00 – FE**.

FF is not allowed. Maximum 6 hex characters are allowed.

Example: - **A1EFAD1123BD**

The default setup is 000000000000, which is for Disable.

Note: 1. This is operational only when EAD makes outgoing connection to the Server.
2. Do not use 00 as character in the string.

7.3.11. Disconnect Active Connection on DSR.

When EAD is connected to the remote server, then user can disconnect the EAD TCP connection by sending the DSR (Data Set Ready) signal. **Default Setting is Disable.**

7.3.12. Packet Data

Some applications require the serial data to be collected and sent to server as fixed number of Characters. In this case EAD can receive the serial data and encapsulate them in a single Packet and send the same in the LAN so that there is always a sync between the serial device and the PC in the LAN. This option by **Default is Disable** and can be Enable on need. If it is Enabled we can set the input characters using number of input characters in packet parameter. Refer 7.3.8

7.3.13. DTR active on Connect Only.

DTR (Data Terminal Ready) will be activated when a network connection is established with EAD01-103. **Default Setting is Disable.**

7.3.14. Exit

Use this option to exit and come back to the previous selection menu

7.3.15. Defeat Long Ack.

User can Disable and Enabled delayed ACK
Default Setting is Enable.

7.3.16. Restart on loss of link.

This option is used to set the EAD to be restarted when the network connectivity has lost.
Default Setting is Enable.

7.3.17. Telnet IAC**7.3.18. Telnet IAC terminal type**

When Telnet IAC is Enabled, terminal type is **VT100.**

7.4. Load factory defaults

Use this option to program the factory default values for all the parameters of the EAD.

You can also load the factory defaults by pressing the ‘Default Switch’ for 10 seconds continuously. Please note that the YELLOW LED (CONNECT LED) will be off when ‘LOAD FACTORY DEFAULT’ switch is pressed continuously for 10 seconds. After 10 minutes it will be on. Refer Default values in section 8

7.5. Change Configuration Password.

Select this option to change the password required for entering in to Configuration Mode for making any changes to the Settings. **Default password is 77277.** This password is needed for programming through Serial and Telnet. This will take only alphabets [A-Z, a-z], digits [0-9] and will not allow any symbols. It must have minimum 3 characters. It will allow maximum 9 characters

7.6. Save and Exit.

To save the programmed parameters, select this option from the main menu. EAD will take some time to save the data you have selected and programmed. Once the new values are stored, EAD automatically will exit from the programming (configuration) mode and will go to Data Connection mode ready for communication or to setup mode, if LAN cable is not connected.

7.7. Exit Configuration Mode

Select this option to exit from the configuration mode without saving the data.

7.8. To upload new firmware.

Select this option to read the instructions to upload a new firmware.

7.9. Enable Boot Messages.

Use this option as enable to display initial booting sequence messages of EAD01-103 like Firmware version and MAC Address. If DHCP option is Enabled, this will display the network parameters also. **Default Setting is Disable.**

8 Factory Default values

Parameter	Default value
Password	77277
IP Address	192.168.0.254
Netmask	255.255.255.0
Gateway	Nil
DNS IP Address	Nil
Port number	7727
Transport protocol	TCP
Network Interface	100 Mbps Full duplex
DHCP	Disable
Baud rate	9600
Data Parameters	N-8-1
Flow control	None
Serial Interface	RS-232
Character wait timeout	0 Sec
Inter-character Delay	0 Sec
Connection status reporting	Disable
Connection time out	30 sec
XON XOFF Pass through	Disable
IP Filtering	000.000.000.000
Start mode	Auto
Accept incoming connection	Enable
Remote IP Address	000.000.000.000
Remote port number	00000
Send CR with LF	Disable
Accept serial data when not connected	Enable
Number of Characters to Send	254
Connection Inactivity timeout	300 Seconds
Disconnect Active connection on Data	000000000000
Disconnect Active connection on DSR	Disable
Packet Data	Disable
DTR active on Connect Only	Disable
Defeat Long Ack	Enable
Restart on Loss of Link	Enable
Enable Boot Messages	Disable
Disconnect character	Disabled
Rx Buffer	2K
Packet Control	Disable
Start Mode Character	1

9 EAD01-103 Operation Under MODBUS Protocol

Ethernet Adaptor – EAD01-103 supports MODBUS protocol based communication. User can send MODBUS TCP command to the EAD through the Ethernet interface, EAD will convert MODBUS TCP queries to MODBUS RTU protocol and sends to serial side. User can connect any device to the serial which is supporting MODBUS RTU protocol. EAD will receive MODBUS RTU response from Serial device. This MODBUS RTU response will be converted in to MODBUS TCP Protocol and transmits through Ethernet interface to the User. MODBUS poll software can be used for MODBUS protocol communication.

Basically network configuration having eight parameters, which are programmable and explained in section 7.1. If EAD01-103 operates under MODBUS protocol one extra parameter will come under this section that is **MODBUS**

Using this user can Disable and Enabled MODBUS protocol. **Default Setting is Enable.**

10 EAD01-103 Operation Under PPP Protocol

PPP (Point-to-point protocol) is a protocol for communication between two nodes using a serial interface. This is commonly used to act as the link layer protocol. Ethernet Adapter EAD01-103 supports point to point protocol based communication. EAD adds network connectivity to your devices by processing PPP protocol, which is required to send and receive data over CDMA, GPRS and Dial-up network, so your devices can be remotely controlled, managed and monitored over the internet. Because of its low cost, it is ideal for high-volume products, which need low cost. It reduces cost and risk and shortens development time to add networking capability as a standard feature.

11 EAD01-103 Operation Under SNMP Protocol

Simple Network Management Protocol (SNMP) is the protocol responsible for allowing network management stations on a TCP/IP internet work to perform management tasks with managed devices. The core of the protocol consists of a set of protocol operations that allow management information to be exchanged between SNMP agents and managers. Ethernet Adapter – EAD01-103 supports simple network management protocol based communication. SNMP enabled EAD can be integrated with devices like UPS and can be used with SNMP managers. Using SNMP EAD, SNMP Manager Queries are converted in to device protocol and vice versa.

Basically serial configuration having eight parameters those are explained in section 7.2. If EAD01-103 is using SNMP, 3 extra parameters will come under serial configuration. The available options are described below

Command Termination

We must set command termination as **Carriage Return (CR)** when SNMP Protocol is using.

Response Termination

We must set Response termination as **Carriage Return (CR)** when SNMP Protocol is using.

Delay between the commands

We can set delay between commands 500ms to 65535ms

12 EAD01-103 Data Backup

The EAD 01-103 connects serial devices to Ethernet network using the IP protocol with Data Backup. The EAD connects serial devices through a TCP data channel or through a telnet connection to computer or other device servers. EAD01-103 provides Ethernet connectivity to your products quickly and economically. During the transmission of data from serial side to Ethernet, data is saved in a flash memory to prevent data loss due to loss of network connectivity and power failure.

Basically serial configuration having seven parameters those are explained in section 7.2. If EAD01-103 using data backup 5 extra parameters will come under serial configuration. The available options are described below

Serial data Backup

Serial data backup will Enable backup of Data to flash, non volatile memory. (Up to Baud rate 57600 only). **Default Setting is Disable.**

Trigger data backup on Power OFF

This will Enable backup of data immediately on power loss. **Default Setting is Enable**

Trigger backup on inactive time out

Trigger backup on inactive time out is Enable enhanced data backup during large power fluctuations. The range is from 1 to maximum of 65534 msec. **Default setting is 65535 milliseconds**

Enhanced data backup protection

Enhanced data backup Protection is Enable backup of data immediately during inactivity in data transfer. **Default Setting is Enable.**

Note:-If you want to work with serial data backup at least one trigger should be enabled.

Data Processing

This is data sending process, we can send data in a pattern, like frame. In this 2 pattern are there namely Pattern 1 and Pattern 2, **START** of the frame and **END** of the frame we need to be set. Selecting '**O**' in serial configuration menu, we can set the Starting letter or word of the frame and Ending letter or word of the frame, which pattern we are selected that start of the frame and end of the frame we need to set which data we are sending in there start and end, other wise data we can't send. In between the frame maximum 1K data we can send. **Default Setting is START and END.**

13 EAD operation in RS 232/ RS 422 / RS 485 Modes

Ethernet Adaptor – EAD01-103 supports RS 422 and RS 485 Serial Interface connectivity in addition to RS 232. The serial option is available and is configurable through Hyper Terminal or Telnet or through browse interface.

13.1 Physical Connection (RS422)

The color of wires used for RS485 - 2 wire and RS422 - 4 wire are as below:

1. Brown : RX+
2. Black : RX-
3. Orange : TX+
4. Red : TX-

Note: Please ensure the proper color-coding & signal type while connecting to the actual Serial device.

13.2 Two Wire Operation: (RS 485)

- a) Short TX+ and RX+
- b) Short TX - and RX -

Take these two wires and connect to the Device's 2 wires with correct Positive and Negative polarities.

Select option 2 in the Serial Interface or Telnet mode selection

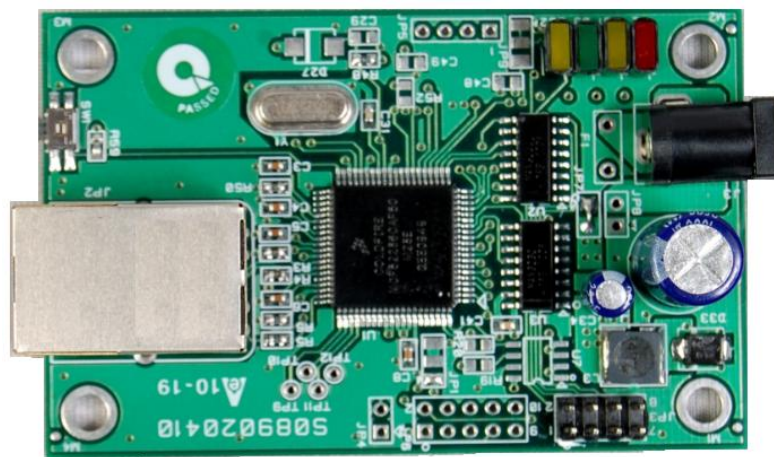
13.3 Four Wire Operation: (RS 422)

- a) Tx+ and TX- of our EAD unit should go to RX+ and RX- of the Serial Device.
- b) Rx+ and RX- of our EAD unit should go to TX+ and TX- of the Serial Device.

Select Option 3 for 4 wire operation in Serial Interface or Telnet mode Selection.

14 Product – Physical Details**EAD01-103 MB (Metal box)**

Physical Dimensions	
Length	135mm
Breadth	90mm
Height	35mm
Weight	750gm
Power	230V AC for MB, 5V – 7V DC for MBX
LED Indicator	
Red	For power
Yellow	For connect
Green TX LED	Data is transmitting through serial
Yellow RX LED	Data is receiving from serial

EAD01-103 B (Board level view)

Physical Dimensions	
Length	79mm
Breadth	50mm
Height	23mm
Weight	30gm

15 Troubleshooting

This section describes commonly encountered problems, associated symptoms, and suggested troubleshooting actions. A general piece of advice: if you are unable to proceed any further, despite the guidelines given through the manual, contact your supplier or the company. It would be extremely useful if you could capture the problem environment to the extend possible (in terms of detailed description of the problem). This will assist in a quick response to your problem. However, there is a rare chance that you might encounter a problem that you cannot solve yourself.

PROBLEM	CHECK
Reset Problem	When You Power on the EAD without Connecting LAN Cable, POWER ON LED will blink for 12.5 seconds and then will remain on. If you connect LAN Cable, the YELLOW LINK LED should glow
Link is not detecting	Check the LAN cable
Not able to connect to LAN	Check the LAN cable, when you connect the LAN cable to EAD YELLOW LED should glow. Check the IP Address and Port Number programmed.
Getting junk character in serial side	Check the serial settings 1) Baud rate 2) Flow control and 3) Data parameter Check the Serial connection from devise to EAD
Not able to send data from serial device to EAD	Check the Serial connection Checks the Tx/Rx are connected to corresponding pins. For serial pinout details refer the <i>Connection and pinout diagrams</i> section in the manual.

16 Glossary of Terms

In the section, we give brief definitions of several important networking terms and acronyms.

A

ARP (Address resolution Protocol)

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address that is recognized in the local network. A table, usually called the ARP cache, is used to maintain a correlation between each MAC address and its corresponding IP address. ARP provides the protocol rules for making this correlation and providing address conversion in both directions.

B***Baud rate***

Baud was the prevalent measure for data transmission speed until replaced by a more accurate term, bps (bits per second). One baud is one electronic state change per second. Since a single state change can involve more than a single bit of data, the bps unit of measurement has replaced it as a better expression of data transmission speed.

The measure was named after a French engineer, Jean-Maurice-Emile Baudot. It was first used to measure the speed of telegraph transmissions.

C***Client program***

A client program is a type of computer program that actively requests service from a server program, which often resides on another computer.

COM port

A COM port is serial communications port (RS 232 interfaced) on a Windows-based PC. Most PCs come with two built-in COM ports, although the number of ports can be extended into the hundreds by installing either multiport serial boards, or network-based serial device servers.

D***Data-stream transmission***

Data-stream transmission refers to a series of data transmitted continuously without interruption.

DHCP

The Dynamic Host Configuration Protocol (DHCP) is an Internet protocol for automating the configuration of computers that use TCP/IP. DHCP can be used to automatically assign IP addresses, to deliver TCP/IP stack configuration parameters such as the subnet mask and default router, and to provide other configuration information such as the addresses for printer, time and news servers.

DNS

The Domain Name System (DNS) is an Internet directory service. DNS is how domain names are translated into IP addresses, and DNS also controls email delivery.

E***Ethernet***

Ethernet is a local-area network architecture developed by Xerox, DEC, and Intel in 1976. It operates using a shared bus or star topology, and supports data transfer rates of 10 Mbps, 100Mbps, and even 1000 Mbps formats

Ethernet frame

An Ethernet frame is a packet of data bits sent from one device to another over an Ethernet network.

F***Firmware***

Firmware is programming that is inserted into programmable read-only memory (programmable ROM), thus becoming a permanent part of a computing device. Firmware is created and tested like software (using microcode simulation). When ready, it can be distributed like other software and, using a special user interface, installed in the programmable read-only memory by the user. Firmware is sometimes distributed for printers, modems, and other computer devices.

H***HOST***

A Host is a computer, such as a PC that is connected to a network. Each host is assigned its own unique IP address.

HTML

HTML (Hyper Text Markup Language) is the computer language used to produce text files that contain typesetting commands that allow the document to be viewed with a web browser (such as Internet Explorer® or Netscape®). HTML defines the structure of tags and attributes used to create Web text documents.

HTTP

HTTP (Hyper Text Transfer Protocol) defines how messages are formatted and transmitted, and what actions the Web server should take.

I***IP address***

An IP address is 32-bit identification number assigned to networking devices connected to a TCP/IP network such as the Internet. IP address is written, for example, in the form 192.168.206.10.

L***LAN***

A LAN (Local Area Network) is a computer network characterized by the fact that a message sent from one LAN computer to another does not pass through a router. Note that most LANs are located within a relatively small geographical area, such as a building or campus.

M***MAC address***

On a local area network (LAN) or other network, the MAC (Media Access Control) address is your computer's unique hardware number. (On an Ethernet LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or host as the Internet protocol thinks of it), a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

Modbus

Modbus is an application layer messaging protocol, positioned at level 7 of the OSI model that provides client/server communication between devices connected on different types of buses or networks. Modbus is a request/reply protocol and offers services specified by function codes. Modbus function codes are elements of Modbus request/reply PDUs (Protocol Data Unit).

N***Netmask***

A netmask is a 32-bit number that is used to determine the network scope of a computer's IP address. The most commonly used netmasks are 255.0.0.0 for Class A networks, 255.255.0.0 for Class B networks, and 255.255.255.0 belongs to a class C network, in which all computers on the network have IP address of the form 192.168.254.xxx.

P***PPP***

The Point-to-Point Protocol is designed for simple links which transport packets between two peers. These links provide full-duplex simultaneous bi-directional operation, and are assumed to deliver packets in order. It is intended that PPP provide a common solution for easy connection of a wide variety of hosts, bridges and routers.

R

RS-232

RS-232 is a standard interface for connecting serial devices. Many modems, display screens, and printers are designed to operate via an RS-232 port.

S***Serial communications***

Serial communications refers to the transmission of data bit-by-bit.

Serial device server

A serial device server is a standalone device that has at least one Ethernet port and one or more serial ports. Serial device servers are equipped with an embedded network operating system and allow computers to access serial devices over a network.

Simple network management protocol

The Simple Network Management Protocol (SNMP) forms part of the internet protocol suite as defined by the Internet Engineering Task Force (IETF). SNMP is used in network management systems to monitor network-attached devices for conditions that warrant administrative attention. It consists of a set of standards for network management, including an Application Layer protocol, a database schema, and a set of data objects.

Socket programming

Socket programming refers to scripts that execute functions, which read data to and from socket.

T***TCP/IP***

The TCP/IP protocol suite refers to the family of network protocols used by most Ethernet networks, and by the Internet, to connect hosts. TCP/IP, in which TCP stands for Transmission Control Protocol and IP stands for Internet Protocol, is a standard for transmitting data over networks.

TCP port

A TCP port is similar to a native COM port, which extends from the Ethernet.

TCP socket

A TCP socket is a program that can send and receive TCP/IP messages by opening a socket, and then reading and writing data to and from the socket.

Telnet

Telnet is a widely used protocol that establishes a network connection with a networked device. Many standard software utilities are based on the Telnet protocol, such as Telnet (system utility name) under Windows and Linux. Many network devices, such as serial device servers and routers have a built-in Telnet console that allows users to configure the device by the Telnet utility.

U***UDP***

User Datagram Protocol (UDP) is a connectionless protocol that, like TCP, runs on top of IP networks. Unlike TCP/IP, UDP/IP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network. It's used primarily for broadcasting messages over a network.

W***Winsock***

Winsock is the standard Windows API utility that uses TCP/IP protocol to connect other Network devices.

Contact

Questions?

Call Sparr Electronics Technical Support at +91-80-23602836

Head Office

Sparr Electronics Ltd.,
No.43, YMS Complex,
HMT Main Road, Mathikere,
Bangalore - 560 054, INDIA.
Phone: +91- 80 - 2360 2836
 +91- 80 - 2360 6308
Fax: +91- 80 - 2360 8346

Branch Offices

Sparr Electronics Limited 203, IInd Floor, Rajhans, Sunder Nagar, Kalina,Santacruz (E), Mumbai. 400 098, INDIA Phone: +91- 22-26655375	Sparr Electronics Ltd, Old No: 39 New No: 4 I Floor IV Main Road Kasturiba Nagar Adayar Chennai - 600020, INDIA. Phone: +91- 44 – 24425073
--	--

Web and Emails

WEB: www.sparrl.com

For Product Information: info@sparrl.com

For Support: support@sparrl.com

For Sales: sales@sparrl.com